12 February 1968

Dear Bob:

As we discussed, I have had a preliminary study made of various possible combinations of TRISPIN, PENTASPIN, NIAGARA, and DRIAGARA machines. A tabulation of these results appears on Enclosure 3. Enclosure 1 lists the cost assumptions and Enclosure 2 operating assumptions.

Some broad, general conclusions that might be drawn are:

1. To obtain access to the negative (and Bimat positive) in minimum time (120 to 130 mins.), you need one Trispin and one Pentaspin or three Trispins.
2. Added manpower doesn't help much with O.N. but does with producing dupes.
3. Minimum immediate expenditure results from the combination of 3 Trispins and 3 Niagaras.
4. Minimum time can best be achieved using a Pentaspin in the system and sufficient operators.
5. The best all around efficiency appears to be 1 Trispin, 1 Pentaspin and 2 Driagaras and utilizing 4 operators. Unfortunately, it requires the highest capital outlay.

This last, I think, deserves some comment. The costs used are heavily weighted by the development costs for the Pentaspin and Driagara. Let's assume that these costs are past and what is needed is equipment for six such production lines are required. Looking at three lines which appear most attractive:

A. 2 Trispins, 1 Pentaspin, 2 Niagaras (least time).

B. 3 Trispins, 3 Niagaras (lowest immediate cost).

C. 1 Trispin, 1 Pentaspin, 2 Driagaras (most efficient).

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Assuming the probable reproduction costs for the quantities involved, give us Encl. 4. Now that I have made the table, it looks as if I doctored it, but I choose the quantity of six systems arbitrarily and the unit cost figures are my first best judgment based on our experience with the Niagara.

It therefore is my conclusion that both the Pentaspin and the Driagara should be developed.

E. L. G.

ELG:atr
Encls. 4

Enclosure (1)
12 February 1968

ASSUMED
EQUIPMENT COSTS (NOT PRICE)
IN QUANTITIES INDICATED

	NO. OF MACHINES		
	ONE	TWO	THREE
TRISPIN	75K	104K	130K
PENTASPIN	145	190	
NIAGARA	36	55	73
DRIAGARA	129	173	207

(1) Design of TRISPIN complete and cost not included.

(2) Niagara costs based on indicated quantities. These might be taken from NER or costs would be appreciably less if fabricated with other orders.

(3) Savings from simultaneous fabrication of Trispins and Pentaspins not considered but could be appreciable due to many common parts.

(4) Same as (3) for Niagaras-Driagaras.

Enclosure (2)
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BASIC ASSUMPTIONS

1. Orig.Negative is 5,000 feet in one length or at least long enough to require "presplicing" to 500 foot lengths.

2. Three Drimat copies are required.

3. No titling.

4. TRISPIN and Pentaspin operating speeds - 200 fpm.
   Niagara and Driagara operating speeds - 100 fpm.

5. Thread-up time each operation assumed at 2-1/2 mins. (probably conservative).

6. Processing times assumed (also conservative).

ON - Bimat	-	20 mins.
Drimat	-	15 mins.
Desimat	-	2-1/2 mins.

7. Material resupply, packing, shipping not included, although much of it can be accomplished within times outlined.

Enclosure (3)
12 February 1968

SYSTEM COMBINATIONS

System	Number of Machines TRISPIN	PENTASPIN	NIAGARA	DRIAGARA	Cost	Nbr. of Operators	Minutes Neg. Avail.	3 Drimat Pos.Avail
1	2	1	1	0	285K	4	130	303
						3	130	317
2	1	1	2	0	275K	4	130	280
3	2	1	2	0	304K	5	125	183
						4	125	233
						3	125	297
4	3	0	3	0	185K	5	120	213
						4	120	238
						3	120	255
5	1	1	0	2	393K	4	130	208
						3	130	258
						2	132	260
6	2	0	0	2	277K	4	170	258
						3	170	278
						2	172	298
7	3	0	0	2	303K	5	120	208
						4	120	223
						3	120	248
8	2	0	0	3	311K	5	170	220
						4	170	245
						3	170	265

Enclosure (4)
12 February 1968

SYSTEM	TRISPIN			PENTASPIN			NIAGARAS			DRIAGARAS			COST FOR 6 SYSTEMS
	Qty	Unit Cost	Total Cost	Qty	Unit Cost	Total Cost	Qty	Unit Cost	Total Cost	Qty	Unit Cost	Total Cost	
A	12	15K	180K	6	26K	156K	12	15K	180K				516K
B	18	14K	252K				18	14K	252K				504K
C	6	20K	120K	6	26K	156K				12	20K	240K	516K